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Motor vehicle air conditioning system - precisely couples pins and
guides to effectively choke or shut off air flow

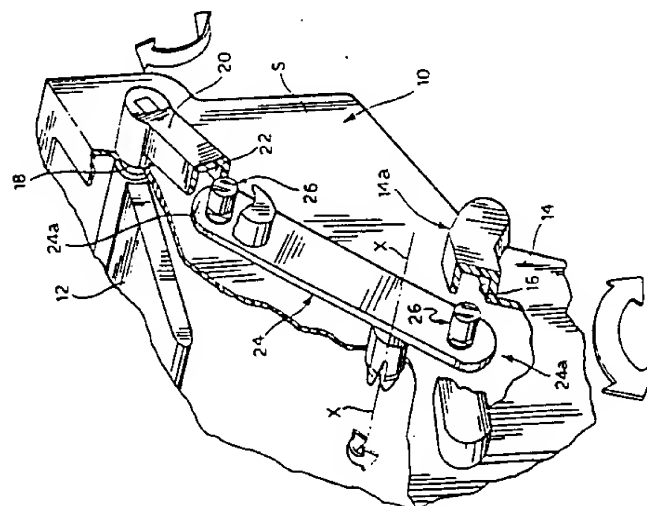
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The pin (26) has a substantially S shaped cross section and comprises a central cylindrical portion (26a) with two opposite faces (28) rounded with a diameter substantially corresponding to the width of the guide (16 and 22), and two integral resilient portions (26b) connected to the central portion (26a), the resilient portions are rounded with a diameter (D2) larger than the width of the guide.

ADVANTAGE - Using improved coupling methods removes troublesome play between pins and guides so making kinematic mechanism of control more precise. (3pp Dwg.No.1/4)
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(54) A control unit for a motor vehicle air-conditioning system.

(57) A control unit for shutters for choking the air flow in a motor vehicle air-conditioning unit includes a transmission lever (24) which is of the rocker-arm type and has ends (24a) provided with pins (26) for cooperating with guides (16, 22) of a control lever

(14) and an operating portion (20) of a shutter (12) respectively. The pins (26) have resilient lateral surfaces, so as to ensure that any play between the pins (26) and the guides (16, 22) is taken up.

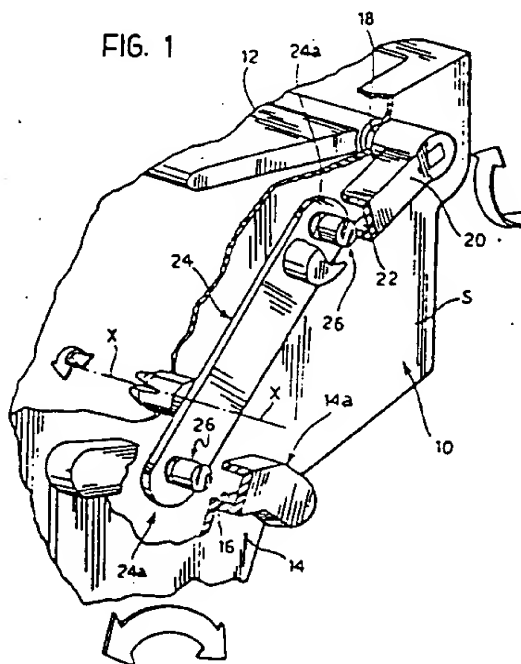


FIG. 1

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A control unit for a motor vehicle air-conditioning system

The present invention relates to a control unit for components of a motor vehicle air-conditioning system, particularly shutters for choking the air flow, comprising at least one transmission lever pivoted to the support structure of the system and having at least one pin slidable in a guide associated with a component of the system which is pivoted to the structure, for causing the movement thereof according to a predetermined law.

A control unit formed in this way includes a transmission lever which is of the rocker-arm type and has two pins arranged at the ends of the transmission lever, the first being adapted for sliding in a guide associated with a manual or electrically-assisted control lever and the second for sliding in a radial guide of a shutter which is pivoted to the structure of the air-conditioning system. By virtue of this arrangement it is possible, in dependence on the different shapes of the guides and on the lengths of the respective arms of the rocker-arm transmission lever, to achieve particular laws for the movement of the choking shutter. For example, the shutter can be made to pivot beyond a particular working angle of the operating lever.

The normal techniques by which the parts of the control unit are made (the injection moulding of plastics material) does not permit a precise coupling to be achieved between the pins and the guides, with the result that there is troublesome play between these elements which makes the kinematic mechanism of the control unit imprecise.

Precise coupling between the pins and the guides could be achieved by an additional finishing operation on the pins, this further operation involving a considerable increase in the cost of the air-conditioning system.

The object of the present invention is to provide a control unit of the type specified at the beginning of the description which enables the above problem to be overcome simply and cheaply.

According to the invention, this object is achieved by virtue of the fact that the pins have radial resilient means for ensuring the resilient take-up of the play between the pins and the guides.

In particular, each pin has a substantially S-shaped cross-section and comprises a central cylindrical portion with two copposite faces which are rounded with a diameter substantially corresponding to the width of the guide, and two integral resilient portions which are connected to the central portion, the resilient portions also being rounded with a diameter larger than the width of the guide.

By virtue of this characteristic, the presence of

the resilient portions enables any play between the pins and the guides to be eliminated, ensuring the precise and reliable operation of the control unit, as well as enabling the normal rotation and sliding of the pins within the guides.

Further characteristics and advantages of the control unit according to the invention will become clear from the detailed description which follows with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 is a partially-sectioned perspective view of a control unit according to the invention.

Figure 2 is a perspective view of a detail of Figure 1, on an enlarged scale.

Figure 3 is a plan view taken on the arrow III of Figure 2, and

Figure 4 is a section taken on the line IV-IV of Figure 3.

With reference to the drawings, a unit for controlling a choking shutter 12 associated with a motor vehicle air-conditioning system is generally indicated 10. The air-conditioning system includes, in known manner, a structure S within which the air ducts and various components of the system itself (heating radiators, fans, etc.) are arranged. An operating lever 14 (shown only partially in Figure 1) is pivoted to the structure S and a shaped guide 16 with a U-shaped cross section is provided at one of its ends 14a.

The shutter 12 is pivoted to the structure S of the system in correspondence with an articulation pin 18 to one end of which is keyed a radial arm 20 in which a guide 22, also of a U-shaped cross-section, is defined.

A transmission lever 24 of the rocker-arm type, which is interposed between the arm 20 of the shutter 12 and the end 14a of the control lever 14, is pivoted to the structure S about an axis X-X substantially parallel to the articulation pin 18 of the shutter 12 and has ends 24a in correspondence with which resilient pins 26, formed integrally with the lever, are inserted in the guides 16 and 22.

Each pin 26 is arranged parallel to the axis X-X of articulation of the transmission lever 24 to the support structure S and has a central cylindrical portion 26a with diametrically-opposed faces 28 which are rounded with a diameter D substantially corresponding to the width of the guide 16 or 22. A pair of appendages 26b project from the cylindrical portion 26a of each pin 26 at a certain distance from the flat body of the lever 24 and are connected to the faces 28 of the central cylindrical portion 26a to define a circular cylindrical conformation of the pin 26 the lateral wall of which has longitudinal slits F in correspondence with the ends

27 of the appendages 26b. The cylinder defined by the appendages 26b has a diameter D_2 which, in correspondence with the respective ends 27, is slightly greater than the diameter D_1 of the cylindrical portion 26a. Therefore, given the particular shape of the pin 26, which is S-shaped in cross-section (Figure 3), the resilient appendages 26b are urged radially towards the centre of the cylindrical portion 26a when each pin 26 is inserted into the respective guide 16 or 22, enabling the elimination of any play existing between the pin and the guide. The insertion of the pins 26 into the guides is facilitated by the presence of a chamfer 30 provided in correspondence with the free end of each pin.

As well as being used for the control of the choking shutters, the control unit described above can, to advantage, be associated with any component of an air-conditioning system.

Claims

1. A control unit for components of a motor vehicle air-conditioning system, particularly shutters for choking and/or shutting off the air flow, including at least one transmission lever pivoted to the support structure of the system and having at least one pin slidable in a guide associated with a component of the system which is pivoted to the structure, for causing the movement thereof according to a predetermined law, characterised in that the pin (26) has radial resilient means (26b) for ensuring the resilient take-up of the play between the pin (26) and the guide (16, 22).

2. A control unit according to Claim 1, characterised in that the pin (26) has a substantially S-shaped cross-section and comprises a central cylindrical portion (26a) with two opposite faces (28) which are rounded with a diameter substantially corresponding to the width of the guide (16, 22), and two integral resilient portions (26b) which are connected to the central portion (26a), the resilient portions (26b) being rounded with a diameter (D_2) which is larger than the width of the guide (16, 22).

3. A control unit for shutters for choking the air flow of a motor vehicle air-conditioning system, comprising at least one rocker-arm-type transmission lever pivoted to a support structure of the system and having ends provided with pins which are adapted to cooperate with guides of a control lever and an operating portion of a shutter pivoted to the structure, respectively, characterised in that each pin (26) has a central cylindrical portion (26a) with two diametrically-opposed faces (28) which are rounded with a diameter (D_1) substantially corresponding to the width of the respective guide (16, 22), from which project two resilient portions (26b)

which are rounded with a diameter (D_2) larger than the width of the guide (16, 22) in order to enable the resilient take-up of the play between the pins (26) and the guides (16, 22).

FIG. 1

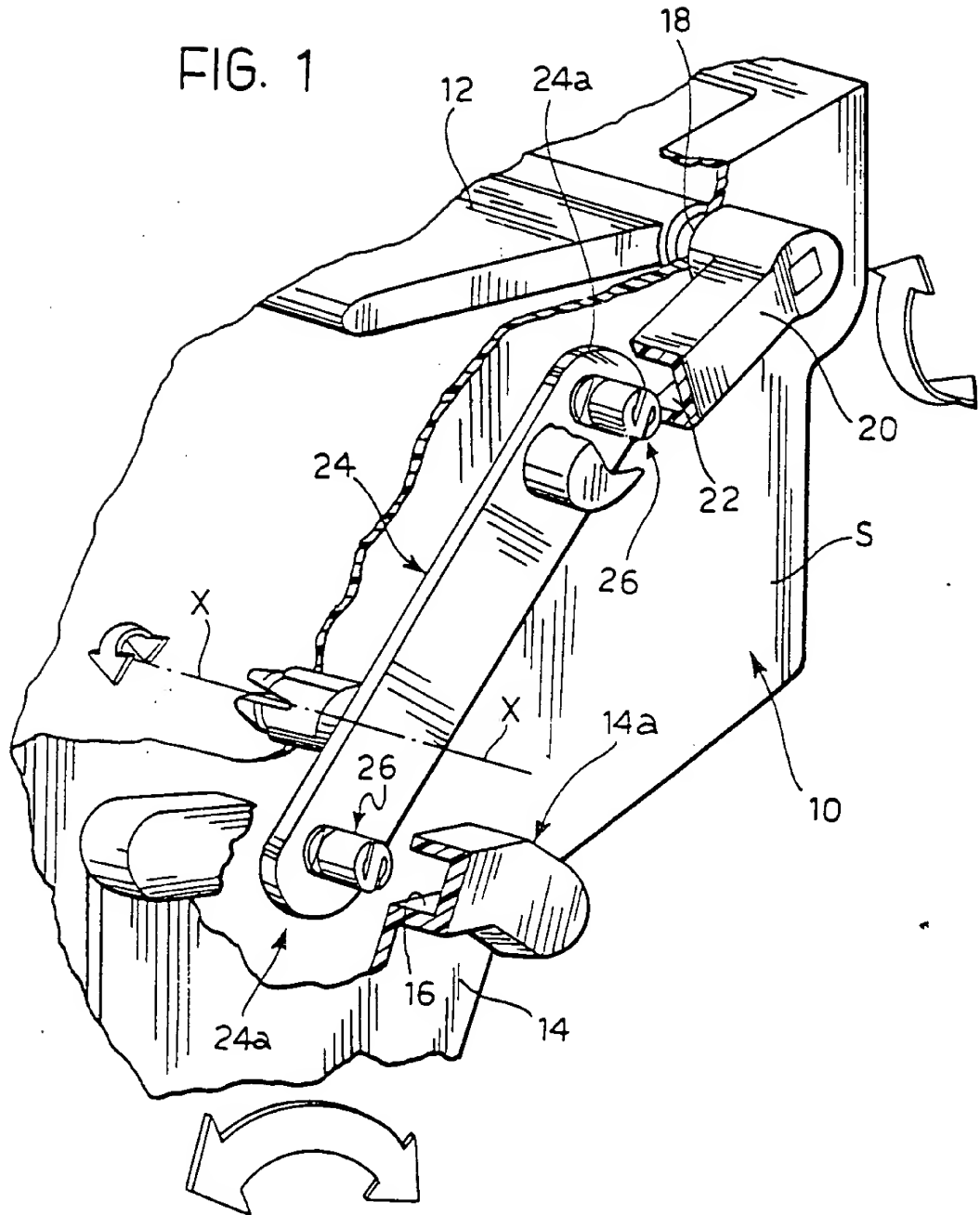


FIG. 2

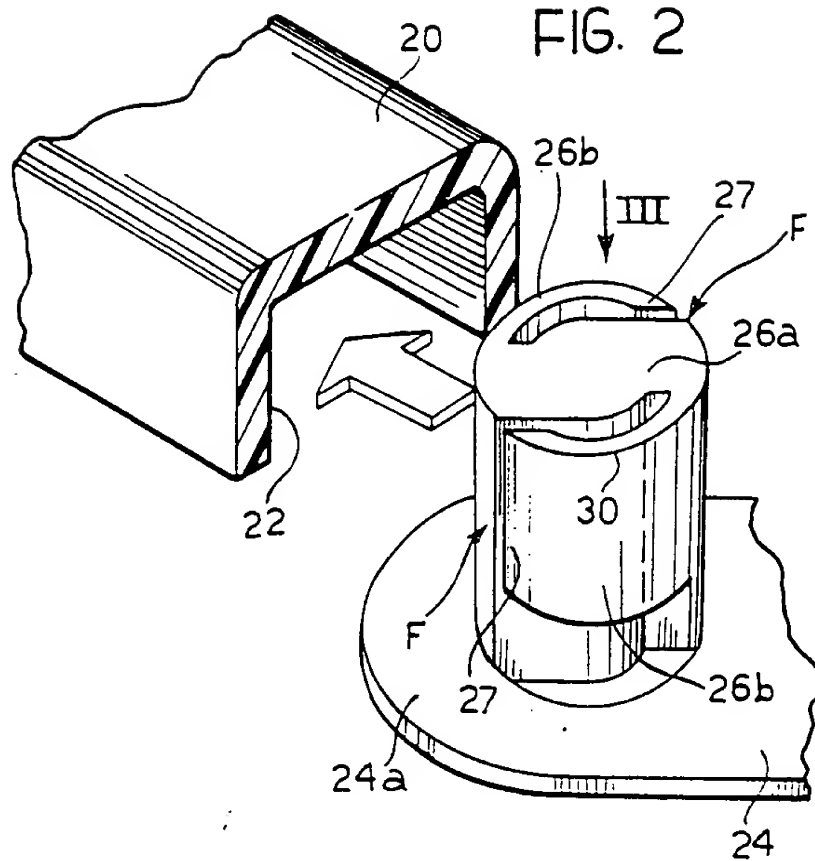


FIG. 3

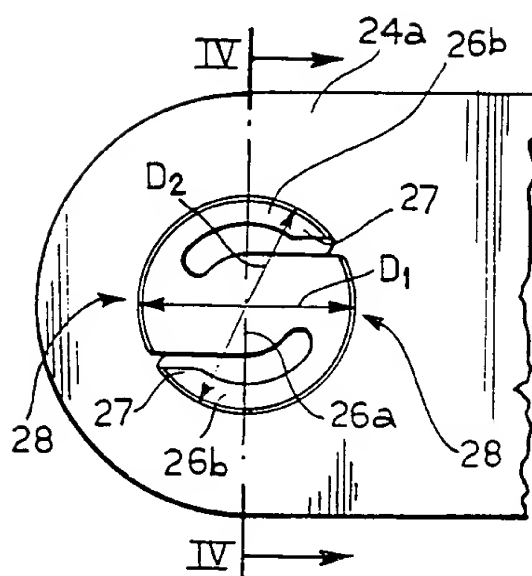
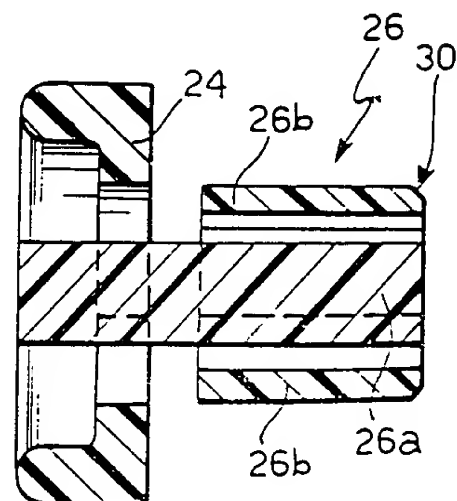


FIG. 4





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0013

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	FR-A-2447493 (FERODO) * the whole document * ---	1, 3	B60H1/00 G05G25/02
P, Y	DE-A-3818565 (R. BOSCH) * the whole document * ---	1, 3	
A	---	2	
A	FR-A-2483559 (J. BEHR) * the whole document * ---	1, 3	
A	GB-A-2001385 (FERODO) * page 2, lines 4 - 50; figure 3 * ---	1, 3	
A	FR-A-2599441 (VALEO) * the whole document * -----	1, 3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B60H G05G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 APRIL 1990	Examiner CZAJKOWSKI A. R.
CATEGORY OF CITED DOCUMENTS			
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